



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,422	07/09/2004	Min-Lung Huang	11572-US-PA	4421
31561	7590	06/21/2005	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE			NGUYEN, JOSEPH H	
7 FLOOR-1, NO. 100			ART UNIT	PAPER NUMBER
ROOSEVELT ROAD, SECTION 2			2815	
TAIPEI, 100				
TAIWAN				
DATE MAILED: 06/21/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/710,422	HUANG, MIN-LUNG	
	<b>Examiner</b>	<b>Art Unit</b>	
	Joseph Nguyen	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is **FINAL**.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-11 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-11 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 09 July 2004 is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |                                                                                                                        |                                                                             |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____                                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|                                                                                                                        | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites "a conductive structure over a bonding pad" and "the chip comprising a bonding pad". It is not understood whether it is the same bonding pad or the different bonding pad since it is not clearly defined. For the sake of examination, it is assumed it is the same bonding pad since that is what is shown in figure 2 of the instant application.

Claims 7-11 are also rejected due to their dependency upon the rejected base claim 6.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4-6 and 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Kao et al. (US 6,249,044).

Regarding claim 1, Kao et al. discloses on figure 3B an under bump metallurgical (UBM) layer 37 (col. 3, line 43) adapted for a chip, the chip comprising a bonding pad 32 (col. 3, line 34) and a transmission line (right hand portion of bonding pad is considered "transmission line" since it can function as a transmission line therein),

Further, Kao et al. discloses on figure 3B the metal layer 37A of the UBM layer close to the transmission line is 1.0 micron thick (col. 4, line 30), which is thicker than the metal layer 37B of the UBM layer having a thickness of 0.3- 0.4 micron (col. 4, lines 31-32) away from the transmission line. Therefore, Kao et al. also teaches a portion of the UBM layer, which is close to the transmission line, is thicker than a portion of the UBM layer, which is away from the transmission line.

Regarding claim 4, Kao et al. discloses a material of the UBM layer 37 is selected from the group consisting of Al (col. 4, lines 8-9).

Regarding claim 5, Kao et al. discloses the UBM layer comprises a plurality of metal layers 37, and at least one of the metal layers 37A at a region which is close to the transmission line is thicker than that 37B which is away from the transmission line (see rejection of claim 1).

Regarding claim 6, as best understood, Kao et al. discloses on figure 3B a conductive structure 37 over a bonding pad, adapted for a chip, the chip comprising a bonding pad 32 and a transmission line coupled thereto, the conductive structure comprising: an under bump metallurgical (UBM) layer 37 formed over the bonding pad,

a portion of the UBM layer which is close to the transmission line is thicker than a portion of the UBM layer which is away from the transmission line (see rejection of claim 1); and a conductive bump 21 (col. 3, line 17), wherein a bottom of the conductive bump is connected to the UBM layer 37.

Regarding claim 9, Kao et al. discloses a material of the UBM layer 37 is selected from the group consisting of Al (col. 4, lines 8-9).

Regarding claim 10, Kao et al. discloses the UBM layer comprises a plurality of metal layers 37, and at least one of the metal layers 37A at a region which is close to the transmission line is thicker than that 37B which is away from the transmission line (see rejection of claim 1).

Regarding claim 11, Kao et al. discloses the conductive bump 21 comprises an Sn-Pb alloy (col. 4, lines 33-34).

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-3 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al., and further in view of Huang (6,452,270).

Regarding claims 2 and 7, Kao et al. discloses on figure 3B substantially all the structure set forth in the claimed invention except at least one liner layer formed among

the metal layers and close to an end of the transmission line connected to the bonding pad. However, Huang discloses on figure 7 one liner layer 340a (col.4, line 2) formed among the metal layers 340 and close to an end of the transmission line 320 (right hand portion of bonding pad is considered “transmission line” since it can function as a transmission line therein) connected to the bonding pad 320 (col. 3, line 39). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kao et al. by having at least one liner layer formed among the metal layers and close to an end of the transmission line connected to the bonding pad for the purpose of providing a better electrical performance (col. 4, lines 59-62, Huang).

Regarding claims 3 and 8, Huang discloses the liner layer 340a comprises copper (col. 4, line 2), which is the same material as that of one of the metal layers 340d (col. 4, line 6).

### ***Conclusion***

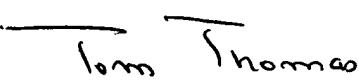
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN

June 17, 2005.

  
TOM THOMAS  
SUPERVISORY PATENT EXAMINER